Amendments to the Drawings:

Please replace drawing sheet 1 containing Figure 1.

A separate "Request for Drawing Amendment" is filed herewith.

REMARKS

I. Election/Restriction

Applicant elects, without traverse, group I directed to claims 1-11 and 13-16 as originally filed. Claim 12 has been withdrawn.

II. Drawings

The examiner objected to the drawings because reference numeral "10" was missing from the drawings sheets. As such, replacement sheet 1 is included herein with reference numeral 10 plainly shown. A request for drawing amendment is also submitted herewith.

III. Claim Objections

The Examiner objected to claim 9 because "is" should be replaced with "in" on line 2, after "pocket." Such amendment has been made and Applicant respectfully requests that the objection be withdrawn.

IV. Claim Rejections

Claims 1, 2 and 10 are rejected under 35 USC § 102(b) as being anticipated by Cicognani. Further, claims 1, 2, 7, 8, and 10 are rejected under 35 USC § 102(b) as being anticipated by Takano et al. Claims 3-5 are rejected under 35 USC § 103(a) over Cicognani in view of Wood as well as the combination of Takano in view of Wood. Claims 7 and 8 are rejected under 35 USC § 103(a) over Cicognani in view of Takano. Claims 7, 9, 11 and 13-16 are rejected under 35 USC § 103(a) over Cicognani in view of Campbell as well as the combination of Takano in view of Campbell. Claim 6 is rejected under 35 USC § 103(a) over Cicognani or Takano in view of Schwabauer. Applicant traverses all rejections.

Applicant now distinguishes the cited references over the present invention.

A. 3,934,968 (Cicognani)

Cicognani describes, but does not claim, a (dual) power transmission belt with teeth on both inner and outer sides, and having a fabric face on the teeth on both sides. Cicognani claims only the mold or method. In the method, the inner teeth are formed on the (grooved) outer surface of

a cylindrical mold in the usual manner known in the industry. The outside teeth are formed by "a plurality of bars" which are positioned around the circumference of the cylindrical inner mold. Each bar forms one, or optionally two grooves or tooth spaces of the outer teeth. When the mold is closed, the inner teeth are formed by transfer molding and the outer teeth are formed by compression molding, as described in our application.

Cicognani claims superior performance to other methods because the outer bars are "rigid elements and are therefore indeformable". This is only partially true. The profile of the bar is relatively rigid compared to the forces required to mold the belt teeth, so the tooth form is, as claimed, very accurate. However, the bars are by necessity very long and thin, and can be deflected easily into a curved or bowed shape. They can also be easily twisted along their length. This can result in the aforementioned accurate tooth form being molded in the wrong location, or in the wrong angular position in some points along the axis of the bar. Cicognani also claims that the bars are guided in an exact manner to ensure uniform pitch and sizing of the outer teeth. See column 5, lines 1-17. In the experience of one of the inventors of the present invention, wear of moving parts, required allowances for assembly and thermal expansion, and practical limits of machining tolerances prevent a multi-part assembly of bars from achieving the accuracy of a single mold as is used for the inner teeth.

The process of Cicognani is inherently a cylindrical geometry, which requires multiple moving rigid mold segments, deformable segments, or a combination to radially close the belt forming cavity. The present application makes the same kind of belt using only two (planar) mold pieces, one for the bottom and one for the top. Since these pieces have multiple tooth cavities, they do not have the slender aspect ratio of Cicognani's bars and therefore are much more rigid and can be made more accurately. Since they are planar, the belt forming cavity can be closed without using multiple bars or flexing the mold. While the planar mold can only cure one section of a cylindrical belt slab at a time and the cylindrical mold can cure the all of the cylindrical belt slab at once, the cylindrical mold is only usable for a belt with a certain number and size of teeth. The planar mold can produce belts with different numbers of teeth.

Planar molds themselves are well known in the manufacture of V-belts and conveyor belts. Cicognani discloses the existence of planar molds for Power transmission belts (column 1, line 59 to column 2, line 32), but only to add the outer teeth to a partially cured belt in which the inner teeth were formed on a cylindrical mold. That method requires both top and bottom planar

molds and also a cylindrical mold for every number of teeth to be made. In that prior art method, the lower planar mold acts primarily as a registration device for the portion of the belt that was already cured on the cylindrical mold. Our disclosed method does not require a cylindrical mold for preforming the inner teeth.

B. 4,510,113 (Takano)

Takano also only describes a cylindrical mold. The inner mold is essentially the same as that of Cicognani and other prior art. Takano recognizes the weakness of the bars in Cicognani's patent: "... tendency of the structures to deform..." (Column 1, line 66 to column 2, line 4). Takano's solution is to use fewer segments. Instead of one bar for every tooth, the patent specifies a "... plurality of arcuate segments ..." (column 3, lines 4-9) and as an example, suggests using four segments of 90 degrees each (column 4, lines 9-15). The larger segments reduce the problem of lateral deflection of the bars and can probably be made as accurately as is the inner mold.

The bar problem is only partially solved. Takano's outer segments still must be in multiple pieces to allow it to close the belt-forming cavity, and the accuracy is still poor where the moving segments meet. This design also introduces a new problem where some of the tooth cavities near the ends of the segments are not moving radially when the center of the segment moves radially. This can move the belt material around the circumference as the mold is closed, causing periodic variation in the belt. Takano cannot use a single piece mold to form the outer teeth as is used in the planar mold of the present application.

Takano describes "... an outlet passage for discharging excess rubber..." (column 2, lines 65-69) and says that "... excess rubber finds its way outwardly through suitable relief passages 71 & 72 in the pressure plate flanges 47 and 53, respectively." (column 6, lines 11-13). No other description of the passage or how it works is provided. The passage is claimed in claim 6. The passage is clearly shown and labeled in Fig. 3 as item 71 & 72, but it does not come near the belt forming cavity, is not connected to the cavity, and therefore cannot vent the belt forming cavity itself. It is unlikely to be an error in Fig. 3 since the text specifies the passages to be in the outer rings 47 & 53 rather than in the segments 24 or the end rings 32 & 34. This same arrangement is shown in Fig 6 where it is once again shown as passage 72 in (cam ring) 70 which is not part of the belt cavity.

Since the ends of the segments are not moving radially, belt material can be trapped between segments as they close together. The passages of Fig. 3 can vent material that is lost between the segments, but only if that material flows to the outer surface of the segments and over the end rings 32 & 34. Since the passages are at the extreme ends of the cylindrical assembly, even if connected to the cavity, they would not able to release excess material from the mold without axial flow within the belt cavity, which would displace the fabric and cords from their proper location.

This problem can also occur with planar molds that have only edge channels for excess material. The waste pockets of our disclosure solve this problem.

The examiner states that Takano "...teaches ... a first and second mold half (18, 25)...". Like Cicognani, Takano must have multiple outer molding pieces to allow the belt-forming cavity to be closed. Takano's passages do not connect to the cavity. Applicant believes the passages disclosed in Takano only prevent fouling of the cam mechanism made up of parts 44,45, 32, 34, and 24 during closing of the outer segments.

C. 4,540,357 (Campbell)

Campbell describes a press cure process for making conveyor belts with corrugated side rails and with "cleats" or "nubs" molded onto the conveying surface. The cleats or nubs are part of the product and the need for them is described at column 1, lines 31-34. They are again described as part of the product at column 4, lines 10-19. Campbell does not use them as a means of correcting the volume of the belt material within the mold. They are part of the product with required dimensions and tolerances implied. Campbell also describes lateral motion of the outer mold to form the corrugated side of the belt. The movable side pieces are forced to a fixed position by the cam wedges and do not contain any description of being designed to vent or accommodate excess material.

Campbell describes compression molding of the nubs and cleats, and the partial compression molding of the side walls at column 5, lines 47-64. When Campbell uses the term "... excess thickness of rubber stock..." it is not referring to waste material that must be removed from the product, but to an allowance in the amount of rubber applied so that the nub, cleat, and side wall cavities are fully filled. Campbell also states that the amount of "excess" rubber

"needed" depends on the volume to be filled. Campbell does not allow for partial filling of the nub or the side wall cavities.

Applicant respectfully contents that the examiner appears to have mistaken the nubs as vents. The office action states "Campbell ... teach(es)... providing a mold having nub cavities (23) for accommodating excess elastomeric material..." That is not what Campbell described in column 5, lines 47-64. Campbell described a simple way to provide material to fill the nub cavities without having to insert individual pieces. Campbell has no teaching describing "... excess thickness of rubber stock...", probably because that is the most common method of making conveyor belts with textured tops, whether the texture is nubs, cleats, chevrons, or type E fabric impression.

D. 4,095,480 (Schwabauer)

Schwabauer discloses a ring-cure V-belt mold with rings made of material with high thermal expansion material. The examiner attributes forming a belt slab into a cylinder before placing it into a mold to Schwabauer. While Schwabauer uses this method, it has been a known process since at least the 1940's.

E. Summary of Arguments

Independent claims 1, 11 and 13 have been amended to recited that the upper and lower molds are planar. This finds support in the subject application in Figures 1 and 2. Further, claim 10 has been cancelled. Claim 16 has also been amended to correct a typographical error.

Based upon the foregoing discussion above, Applicant resepectfully contends there is a significant difference between the method claimed and the cited patents by Cicognani, Takano, Wood, and Schwabauer. The cited patents all relate to a method of making endless belts with cylindrical molds, where a separate special mold is required for each tooth profile and number of teeth. In that method, the belt slab is cured all at once, improving uniformity and reducing the time and cost to produce an individual belt slab. To gain this efficiency requires a very large investment in molds to produce different sizes. This method works well when teeth are molded only on the inside of the belt and a compliant diaphragm is used to form the smooth outer surface and to compress the layers together. It is more difficult for dual power transmission belts

because it is difficult to simultaneously provide the necessary compression and accurately form the outer teeth. The cited Cicognani & Takano patents attempt to address that problem.

The method of this application uses a planar mold in a press to cure only a portion of the power transmission belt at one time. The planar mold is lower in cost and can be used for many sizes of belts (number of teeth), so the cost of molds to make many sizes is much less. This advantage is offset by greater time and cost to produce an individual belt slab. The planar mold can easily and accurately compress the layers of the belt as required, while accurately forming teeth on both sides. It does so because the planar top and bottom molds can be made and aligned accurately.

Applicant respectfully contents that Cicognani is applicable to the present invention. Cicognani teaches the use of multiple molding bars to form the outside teeth. Takano teaches the use of about four curved segments to form the outside teeth. Claim 1 of the present invention is for a planar mold which forms teeth on both sides without having to use multiple bars or segments, and Applicant respectfully contends that it should be allowed.

Takano also discloses an "outlet passage for discharging excess rubber from the molding space". Applicant respectfully traverses this interpretation because the disclosed passage does not come close to the molding space. In spite of that, the concept was described and could preclude the disclosed edge channel if deemed to somehow be able to extract rubber from the closed ends of the cylindrical mold. It should not preclude the disclosed waste pockets of the present invention, which are distributed throughout the face of the mold and which allow removal of excess material without lateral displacement of the cord or fabric layers.

The cited patent by Campbell makes no references to accommodating excess waste material.

Based upon the foregoing, Applicant respectfully contends that claims 1, 11, and 13, as well as the claims that depend therefrom, are in condition for allowance.

CONCLUSION

In response to the Office Action dated March 17, 2006, claim 10 was cancelled and claim 12 was withdrawn. Claims 1, 9, 11, 13, and 16 have been amended pursuant to 37 C.F.R. 1.121. It is believed these amendments have placed the amended claims in conformance with the requirements of the Office Action. At this point, Applicant believes that the claims remaining in

the case distinguish over the art cited and comply with the requirements of 35 U.S.C. §102, §103, and §112. As such, allowance of the claims is respectfully requested.

Respectfully submitted,

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